



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/895,319	07/02/2001	Toshiaki Shinohara	210314US2	6650

22850 7590 03/24/2003

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

NGUYEN, DILINH P

ART UNIT	PAPER NUMBER
----------	--------------

2814

DATE MAILED: 03/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/895,319

Applicant(s)

SHINOHARA, TOSHIAKI

Examiner

DiLinh Nguyen

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noda et al. (U.S. Pat. 5767573) in view of Ueno et al. (U.S. Pat. 6297959).

Noda et al. disclose a semiconductor device (figs. 1-2, column 8, lines 40 et seq.) comprising :

- a semiconductor element 101;
- a lead frame 103 having a first surface for mounting the semiconductor element thereon, and a second surface opposite from the first surface;
- a circuit pattern layer 106 provided on the second surface of the lead frame;
- an insulation layer 105 provided on the layer 106 opposite the lead frame; and
- a solder layer (SD) between the second surface of the lead frame and the layer 106, wherein the solder layer (SD) being better in heat conduction than the insulation layer.

However, Noda et al. fail to disclose the circuit pattern layer 106 is a metal block.

Ueno et al. discloses a semiconductor device comprising: a radiator 41, wherein heat generated from the IC 1 is transferred to the radiator 41 and then further transferred to a chassis 12 (fig. 2, column 4, lines 48-55) to provide a radiation structure

Art Unit: 2814

for a heating element which can prevent the leakage of silicon grease. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Noda et al. to provide a radiation structure for a heating element which can prevent the leakage of silicon grease, as shown by Ueno et al.

- Regarding claim 2, Ueno et al. disclose the radiator 41 is disposed in opposed relation to the semiconductor element.
- Regarding claim 3, Ueno et al. disclose the radiator 41 has a wider surface opposite the bonding material than the bonding material.
- Regarding claim 4, Noda et al. disclose the semiconductor element includes a plurality of semiconductor elements 101a, 101b and 102, and wherein the circuit pattern layer is separate for each insulated unit between the semiconductor elements, and is provided in corresponding relation to at least one of the semiconductor elements.
- Regarding claim 5, Noda et al. disclose a molding resin MR package configured to sealing the semiconductor element, the lead frame and the circuit pattern and wherein the insulation layer is better in heat conduction than the resin package (fig. 1, column 8, lines 51-56). Noda et al. fail to disclose the resin package is uncovering the insulation layer.

Ueno et al. disclose an insulation layer 11 is uncovering by a Mylar tape 10; therefore, the radiator 41 is closely contacted to the chassis 12 through the insulation layer.

Art Unit: 2814

- Regarding claim 6, Noda et al. disclose the insulation layer comprises resin and filler components (column 8, lines 51-56).

3. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Noda et al. (U.S. Pat. 5767573) in view of Ueno et al. (U.S. Pat. 6297959) and further in view of Applicant Admitted Prior Art (fig. 8).

Noda et al. and Ueno et al. disclose the claimed invention except for the first surface of the metal block is closer, as viewed in the vertical direction to the lead frame than the second surface of the metal block; an insulation space between the circuit pattern layer and a third surface of lead frame.

AAPA (fig. 8) discloses the metal block 5 has the first surface and the second surface; wherein the first surface of the metal block is closer, as viewed in a vertical direction, to the lead frame than is the second surface of the metal block. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Noda et al. and Ueno et al. to increase the heat dissipation for the semiconductor package and design flexibility in mounting semiconductor device, as shown by AAPA.

Allowable Subject Matter

Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments filed 1/16/03 have been fully considered but they are not persuasive.

The applicant argues that Noda et al. disclose a circuit pattern layer 106 and Ueno et al. disclose a radiator 41; however, Ueno et al. do not teach or suggest the radiator 41 used as a circuit pattern.

Noda et al. disclose a circuit pattern 106 provided on the second surface of the lead frame, wherein the lead frame 103 having a first surface for mounting the semiconductor element thereon and wherein the heat generated from the semiconductor element is transferred to the circuit pattern 106 and then further transferred to a metal heat sink 104.

Art Unit: 2814

Ueno et al. discloses a semiconductor device comprising: a radiator 41, wherein heat generated from the IC 1 is transferred to the radiator 41 and then further transferred to a chassis 12 (fig. 2, column 4, lines 48-55) to provide a radiation structure for a heating element which can prevent the leakage of silicon grease.

Therefore, the circuit pattern 106 of Noda et al. and the radiator 41 of Ueno et al. have the same function, which is to provide good heat dissipation for the semiconductor package device.

In response to applicant's argument that there is no suggestion or motivation to increase a thickness of the circuit pattern layer 106 in Noda et al. as the radiator 41 in Ueno et al. and there is no suggestion to combine the references, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DiLinh Nguyen whose telephone number is (703) 305-6983. The examiner can normally be reached on 8:00AM - 6:00PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

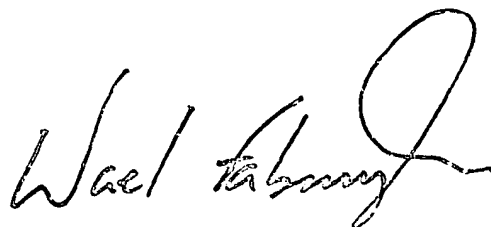
Application/Control Number: 09/895,319

Page 7

Art Unit: 2814

DLN

March 19, 2003

A handwritten signature in black ink, appearing to read "Wael Tabery". The signature is fluid and cursive, with a large loop at the end.

SUPERVISORY PRIMARY EXAMINER
TECHNOLOGY CENTER 2800